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COMPLETE SPECIFICATION.

Improvements in or connected with Sterilising Apparatus.

We, JOHANN FRANZ HUGO GRONWALD, Apothecary, of 33 Kaiserstrasse C. and EMIL HEINRICH CONRAD OEHLMANN, Engineer, of 70 Dresdener Strasse S., both of Berlin in the German Empire, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained
5 in and by the following statement :—

Our invention relates to apparatus for sterilising milk and other liquids in bottles and consists in improved arrangements by means of which the liquid contained in the bottles can be sterilised under steam pressure, thereby preventing the boiling over of the liquid, and the bottles after sterilisation can be closed immediately inside the
10 apparatus without coming into contact with the outer atmosphere.

On the sheet of drawings

Figs. 1 and 2 show our improved apparatus in vertical and horizontal section.

Figs. 3 and 4 show a modification of the same, also in vertical and horizontal section.

15 The apparatus consists of a heating vessel A containing a stand B with recesses *b* for the bottles C, represented as milk bottles on the drawings. Through the bottom of the heating vessel A and the bottle stand B a rod D guided in a stuffing box *d*¹ and bush *d*² passes and carries at the top a press plate *d* while at the bottom it is connected to a lever H.

20 The filled bottles are placed into the recesses *b*¹ and the stoppering device, shown on the drawings as Fritzner's stoppers, are placed loosely upon the bottle necks in such a manner that the press plate *d* in descending will come upon the closing bows *c*.

The bottles and stoppers having been placed in this manner, the apparatus is used as follows : The vessel A is filled with water and the upper part or cover E is placed
25 and bolted fast upon it. The water in the vessel A is heated by steam in any suitable ordinary manner ; for instance, by means of an outer steam jacket, or by steam pipes in the interior of the vessel, these arrangements not being shewn on the drawings. The milk contained in the bottles C is gradually brought to boiling, but before this occurs the steam from the already boiling water has filled the interior of the
30 apparatus A. E. This steam not only sterilises the air enclosed in the apparatus, but prevents by its pressure the rising and boiling over of the milk in the bottles. The sterilising process thus takes place in a quiet and moderated manner, and no material can be lost, so that the bottles may be almost completely filled and the rising of the milk need not be provided for by only partially filling them. The latter circumstance
35 is of great importance for the commercial utilisation of the process, for if the milk is boiled in the bottles without pressure exceeding that of the atmosphere the milk rises considerably, in consequence of which the bottles after refrigeration of the sterilised milk are only filled to about three quarters of their capacity and the contents in different bottles vary in quantity, so that a really uniform quantity cannot
40 be offered for sale.

After the sterilisation in the apparatus has been completed, the pressure plate *d* is drawn downwards by means of the lever H and closes thereby all the bottles contained in the apparatus simultaneously. As a mixture of air and steam was contained in the apparatus during the boiling, the refrigeration of the milk in the bottles will not
45 produce a vacuum or only so small a vacuum that it cannot affect the contents injuriously.

The press plate *d* is shaped to suit the arrangement of the bottles in the stand B, and is circular if the bottles are arranged in a circle as shewn on fig. 2, but is made oblong when the bottles are arranged in one or more lineal rows.

[*Price 6d.*]

Gronwald & Oehlmann's Improvements in or connected with Sterilising Apparatus.

In the modification shewn by figs. 3 and 4 the press plate *d* is arranged fixed to the cover E and the stand B made moveable, and ordinary corks are used instead of Fritzner's stoppers. The corks are made taper or grooved in their lower parts, and the press plate *d* is arranged at such a distance from the top of the bottles that the corks swelling through the steam can rise but not fall out of the bottle necks. When the sterilisation of the milk is finished the corks resting loosely upon the bottle mouths are pressed firmly and air-tight into them by lifting the bottle stand B, after which, if required, a further pressing down of the corks can take place. 5

When making the apparatus of large size, it is preferable to arrange the bottles and press plates in groups and to fix the press plate for the central group similarly as shewn by fig. 3 to the cover of the apparatus and the other press plates round the same to the bars passing through the moveable bottle stand and fixed to the bottom of the apparatus. 10

The arrangement for stoppering or corking the bottles may be modified in any known manner producing a similar result. Naturally other liquids than milk can be sterilised by means of the same apparatus. 15

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is

Firstly. In apparatus for sterilising liquids in bottles the arrangement of a closed heating or boiling vessel in combination with devices for holding and stoppering or corking the bottles contained in said vessel operated from the outside substantially as hereinbefore described and for the purposes set forth. 20

Secondly. In combination with closed heating or sterilising vessels bottle stands fixed in the same and press plates operated from the outside of said vessels for stoppering or corking the bottles, substantially as hereinbefore described with reference to figures 1 and 2 of the drawings and for the purpose set forth. 25

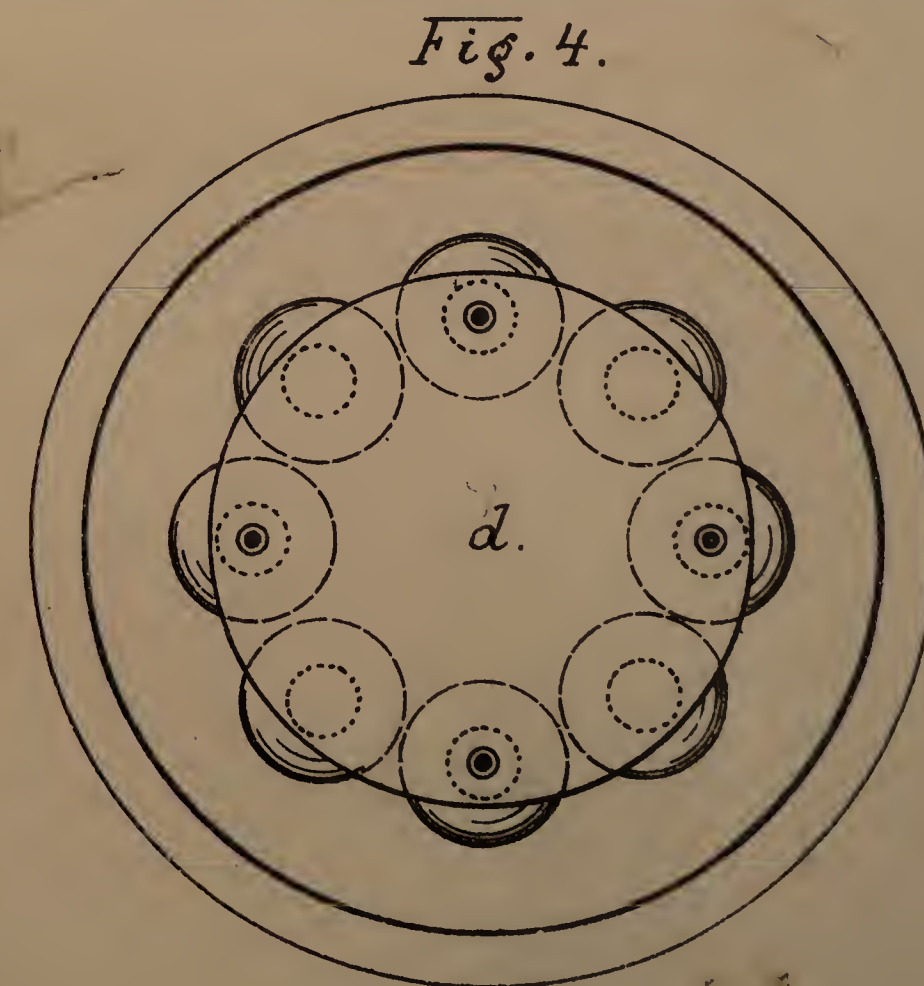
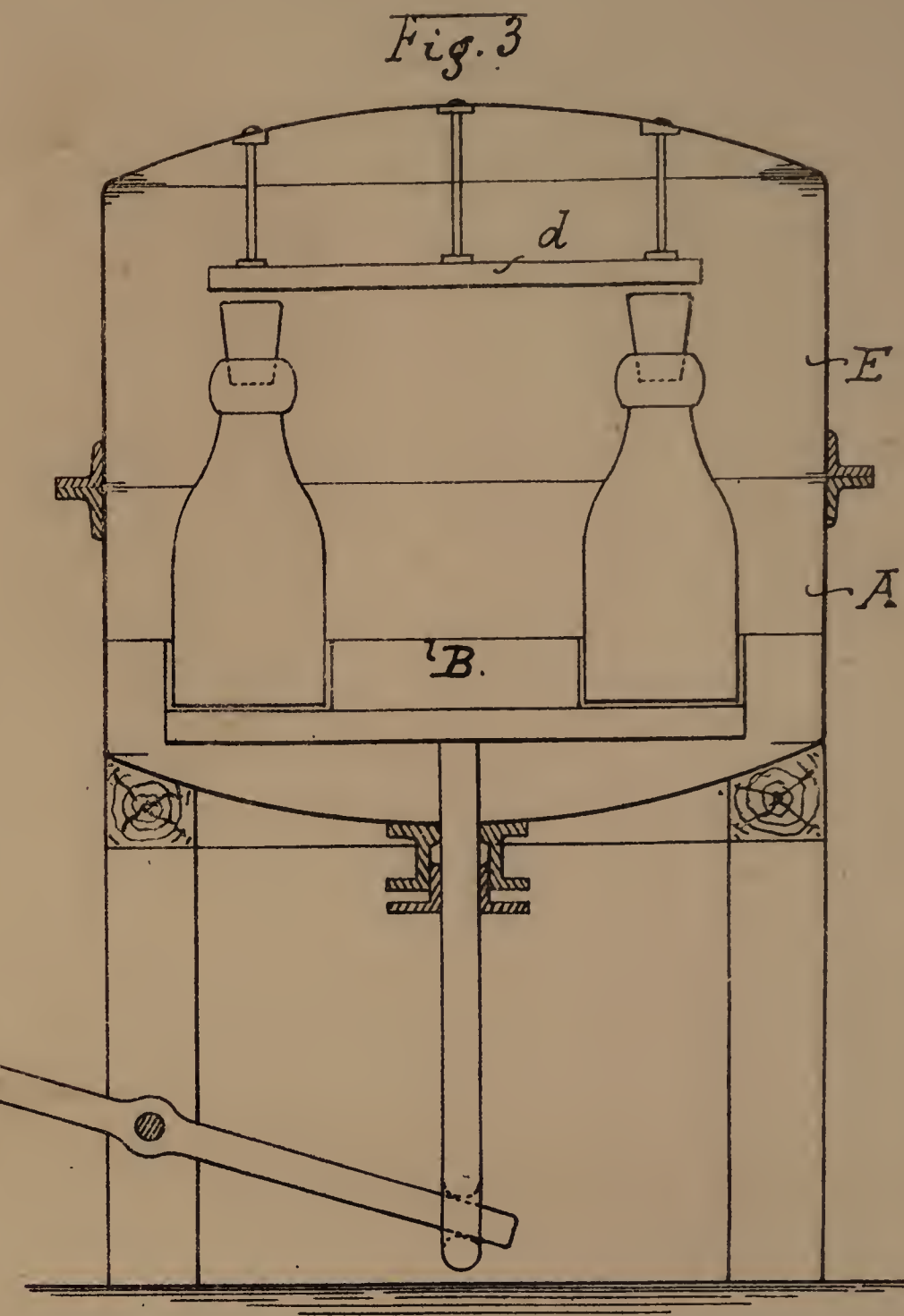
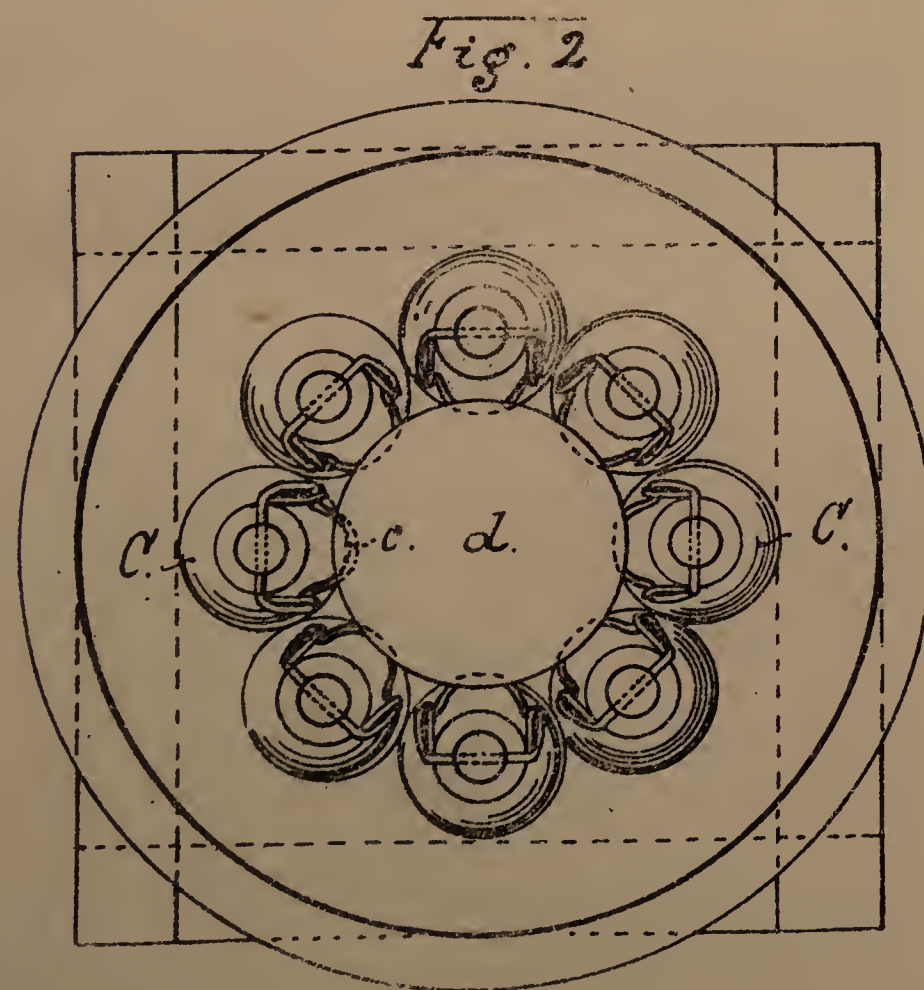
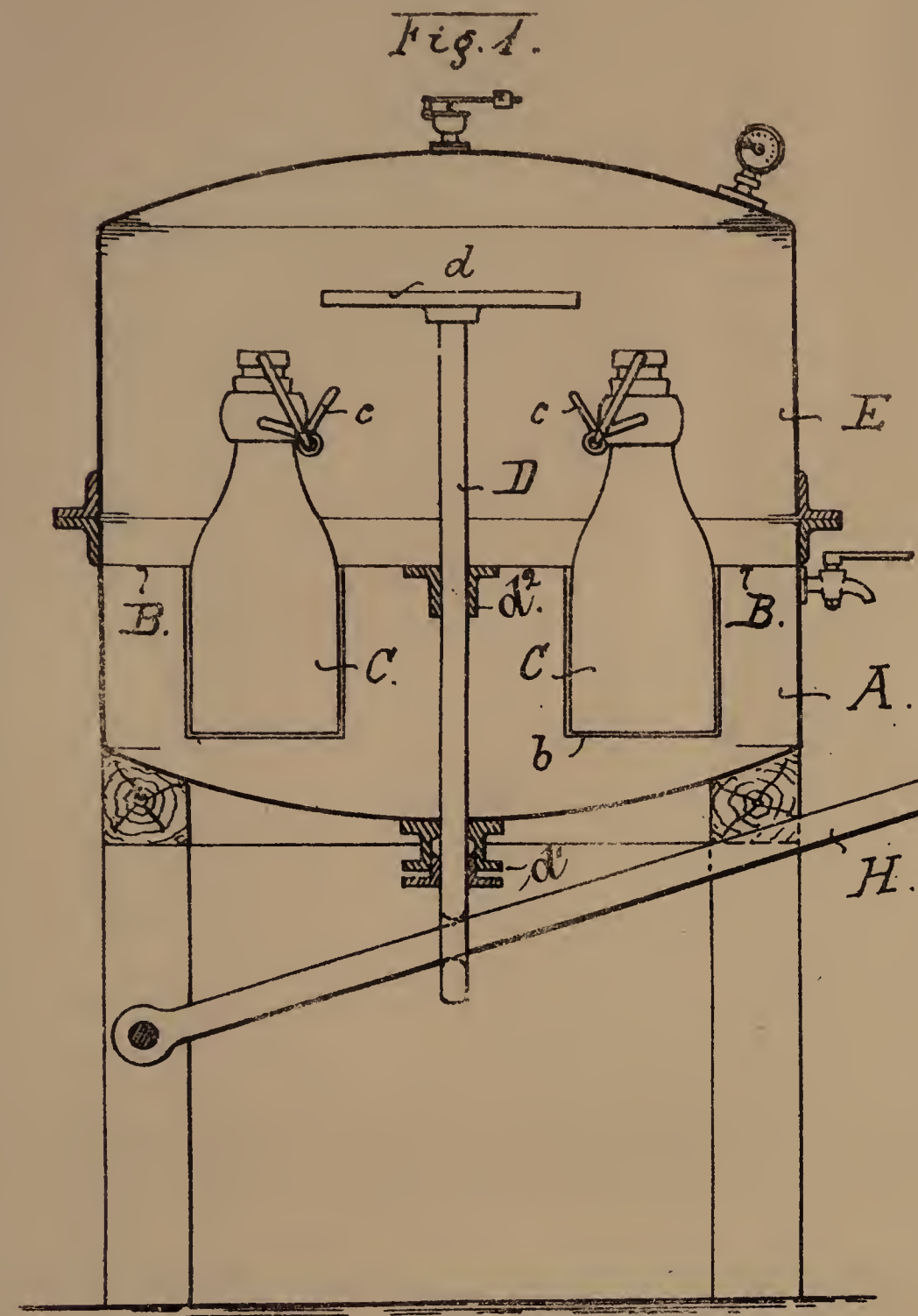
Thirdly. In combination with closed heating or sterilising vessels moveable bottle stands operated from the outside of said vessels and press plates fixed to the vessels for stoppering or corking the bottles substantially as hereinbefore described with reference to figures 3 and 4 of the drawings and for the purpose set forth. 30

Dated this 3rd day of January 1890.

EMMOTT & Co.,
Agents for the Applicants.

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[This Drawing is a reproduction of the Original on a reduced scale]

